COMMONWEALTH of VIRGINIA

DEPARTMENT OF ENVIRONMENTAL QUALITY

PIEDMONT REGIONAL OFFICE
4949-A Cox Road, Glen Allen, Virginia 23060
(804) 527-5020 Fax (804) 527-5106
www.deq.virginia.gov

L. Preston Bryant, Jr.
Secretary of Natural Resources

David K. Paylor
Director

Gerard Seeley, Jr.
Regional Director

May 4, 2006

King William County
McCauley Park Subdivision
Revision 4, Standby Generator
21324

Todd Rodgers
McCauley Park, LLC
7240 Lee Davis Road
Mechanicsville, Virginia 23111

Dear Mr. Rodgers

This Office has received revised plans as prepared by Balzer and Associates, for the referenced facility. The plans entitled "McCauley Park, Pump Station, Plans and Specifications" with four revisions include ten sheets and are engineer stamp dated April 19, 2006. The specifications entitled "Electric Power System Specification" April 11, 2006.

The project consists of a previously approved gravity collection system, pump station and force main to serve a residential and commercial park. This revision adds standby power to the pump station. King William County will own the facility.

The evaluation of this revision has been confined to technical requirements and design criteria, as stipulated in the Commonwealth of Virginia *Sewage Collection and Treatment Regulations*.

In accordance with Virginia Water Control Law, *Code of Virginia*, 1950 as amended in Title 62.1, Section 62.1-44.19, this letter report is to advise that the previously mentioned revision is technically adequate and is approved by this office with the condition that provisions regarding the standby power are included in the Operations and Maintenance Manual.

King William County
McCauley Park Subdivision
Revision 4, Standby Generator
21324

One set of the previously described plans and specifications with Virginia Department of Environmental Quality approval stickers is enclosed.

This letter is your Certificate to Construct

Sincerely,

Raymond R. Barrows, Jr., P.E.
Area Engineer
Office of Wastewater Engineering

J. R. Bell Jr., DEQ-PRO
Thomas Irungu, M.D., M.P.H., Director, Three Rivers Health District
Frank A. Pleva, Administrator, King William County
F. Cameron Palmore, O.E., Balzer and Associates
James C Pyne, Ph.D., P.E., HRSD

7/03

Project: McCauley Park

PUMP STATION REVIEW FORM

Page 1 OF 6
Date 4/3/06
Reviewed By: RRB

REQUIREMENT	REFERENCE	COMMENTS
Location of Pump Station King William		
Buffer zone: 100' +	C2	100' recommended
Station Protected from 100-year flood: X	C1 note	
Fully operational during 25-year flood: OK	C2	
All-weather access road provided: yes	C2	

RECEIVING FACILITIES accepted by King William

Capacity of receiving sewer line _____ MGD _____ Adequate?

Capacity of receiving pump stations _____ MGD _____ Adequate?

Capacity of receiving STW = _____ MGD _____ Adequate?
_____ STP average flow (1 yr.) _____ MGD

PRETREATMENT

Discharge piping designed to prevent grit from settling in lines of pumps not in operation: (Y)/N) C8

Briefly describe any pretreatment provided: none C8
(restaurants must have a grease trap)

PUMPING UNITS

Type of Pumps Provided submersible C8

Number of pumping units provided: 2 C8 minimum of 2

C9

Pump No.	Friction Head (ft)	Static Head (ft)	Rated Capacity (gpm)	Rated TDH (ft)	Operating Capacity (gpm)	Computed TDH (ft)	Variable Constant Speed
1-2	97-121	112	248	248	248	233	✓

7/03

Project: McCauley Park

PUMP STATION REVIEW FORM

Page 2 OF 6
Date 4/2/06
Reviewed By: RRB

STATIC HEAD: -

High point elev: 168
Pump Off elevation: 56
112

RESIDUAL HEAD: - 24

FRICTION HEAD; - 97

APPERTENANCE:

C =

EQ LENGTH OF PIPE, ft

Friction losses:

FLOW (gpm)	RES + STATIC HD (ft)	FRICTION LOSSES (ft)	TDH (ft)	velocity (fps)	loss/100' (ft)
250	136	97	233	$\frac{250}{2.5 \times 6^2} = 2.8$	

Plot FLOW against TDH on the next page (pump curve).

The pumps will operate at 230 gpm vs. 250 feet TDH,
to 340 gpm vs. 200 feet TDH.
powered by a _____ HP electric motor.

10/01

PUMP STATION REVIEW FORM

Date 4/3/06

Reviewed By: RRH

Project: McCauley Park

REQUIREMENT	REFERENCE	COMMENTS
FLOW MEASUREMENT (IF PROVIDED)		
Type of measuring device lapsed time meter	notes pg 6	
Capacity _____ MGD Properly Sized? (Y/N)	_____	
CROSS-CONNECTION CONTROL		
RPZ device on potable water line to pump station?	future ?	
If "No", explain		
Seal water system provided? (Y/N)	_____	
Adequately protected? (Y/N)		
RELIABILITY		
Reliability Class 1		
Provision for continuous operability provided?	_____	
Describe provision	_____	
Adequate? (Y/N)		
Is adequate power distribution provided? (Y/N)	_____	capable of starting the specified pumps
Breaker settings or fuse ratings adequate? (Y/N)	_____	
Electrical control center locations adequate? (Y/N)	_____	inside and be able to see the pump station
Are 3-phase motors adequately protected from short circuits and overloads? (Y/N)	_____	check the phase that is available to the station
Low voltage protection for motors? (Y/N)	_____	all pump motors
Emergency power equipment adequately located? (Y/N)	_____	
Adequate emergency power generator starting system?	_____	battery with a trickle charge or can start three consecutive times
Alarm system provided? (Y/N)	_____	
Describe		
Is the alarm system adequate for the designated reliability class? (Y/N)		

(Class I must monitor main power supply, auxiliary power supply, failure of each pump to discharge, and high liquid level in wet/dry wells; and be equipped with a test function and a back-up power supply. On-site audio-visual alarm required with telemetry to site manned 24 hours per day.) Decibel rating for the audio alarm = _____ decibels at _____ feet.

(Class II/III must monitor high liquid level in wet well with on-site audio/visual alarm.)

Cameron Palmore 333-6[illegible]

7/03

PUMP STATION
REVIEW FORM

Page 3 OF 6
Date 4/3/06
Reviewed By: RWB

Project: McCauley Park

REQUIREMENT	REFERENCE	COMMENTS
Is capacity of pumping equipment adequate? (Y/N)	C8	
Can peak flow be pumped with largest unit out of service? (Y/N)	C8	
Alternating control: yes	notes ch 2	
Type of control mechanism: submersible transducer	notes ch 4	Adequate?
Controls adequately protected from the weather: (inside or NEMA rated: OK)	C8	
Junction Box out of Wet Well? yes	C8	
Individual suction and intake lines:	N/A	
Suction line size ____ inches	N/A	4-inch minimum
Velocity (range) in suction line ____ fps	N/A	2 to 6 fps
Discharge line size 4 inches	C8	
Velocity (range) in discharge line 6.7 fps		2 to 8 fps
Are line sizes and velocities adequate? (Y/N)		250 / 2.5 π 4²
Is there a limit switch? (Y/N) Velocity range ok? (Y/N)		
Is gate valve provided on each suction line? (Y/N)	C8	
Gate valve and check valve on each discharge line? (Y/N)	C8	both on each line
Size of spheres that pass through pump 3 inches	notes C8	minimum 3" diameter Can pass 2" if a ≤ 2" bar screen is provided
If less than 3 inches, explain:		

SUBMERSIBLE PUMP STATIONS

Provisions for pump quick disconnect & reconnect: yes	C8	for small stations
Hoist and accessories: yes	C1	
Shut-off & check valves located in a separate vault? (Y/N)	C8	

SUCTION LIFT STATIONS

Net positive suction head requirements met? (Y/N)		
Gate valve provided on suction line? (Y/N)		
Air relief piping on pump discharge line? (Y/N)		min. 1.25" diameter
Pumps, shutoff, & check valves located outside wet well?		

7/03

Project: King William

PUMP STATION REVIEW FORM

Page 4 OF 6
Date 4/3/06
Reviewed By: RRB

REQUIREMENT	REFERENCE	COMMENTS
WET WELL		
Is there mechanical equipment/screens which requires personnel to enter the wet well? (Y/N)	_____	If yes, there must be mechanical ventilation
If "No", is a 4-inch downward-facing, screened vent provided? (Y/N)	_____	
Volume from floor to rim = _____ cu. ft. (next page)	_____	
Ventilation fan capacity _____ cfm	_____	
Air changes per hour (30 air changes/hr minimum for intermittent operation) (12 air changes/hr minimum for continuous operation)		
air changes/hr = $\frac{\text{fan capacity} \times 60}{\text{volume}}$ = $\frac{(\quad \text{cfm}) \times 60}{(\quad \text{cu. ft.})}$ =		air changes/hr
Is ventilation adequate? (Y/N)		
Fan of non-sparking variety? (Y/N)	_____	
Adequate access provided? (Y/N)	_____	to pull equipment
Adequate lighting provided? (Y/N)	_____	to work at night
Wet well fillets provided? (Y/N) Slope 1:1	C8	minimum of 1:1
Wet well divided? (Y/N)	C8	
If "yes", properly interconnected? (Y/N)		
Volume between pump off and pump 1 on = _____ gallons		(59.28 - 56.8) ft · 4.5^2 · 7.48 = 800 gal
Is design adequate to prevent both pump from overheating due to excessive starts and septic conditions due to excessive detention time? (Y/N)		
DRY WELL		
Adequate access provided? (Y/N)	_____	
Provisions for removing equipment? (Y/N) Describe	_____	
Sump pump provided? (Y/N)	_____	Back to wet well and down towards the water level
Discharge point _____		
Volume of dry well = _____ cu. ft.	_____	
Ventilation fan capacity _____ cfm	_____	
Air changes per hour (30 air changes/hr minimum for intermittent operation) (12 air changes/hr minimum for continuous operation)		
air changes/hr = $\frac{\text{fan capacity} \times 60}{\text{volume}}$ = $\frac{(\quad \text{cfm}) \times 60}{(\quad \text{cu. ft.})}$ =		air changes/hr

7/03

Project: McCawley Park

PUMP STATION REVIEW FORM

Date 4/3/06
Reviewed By: RSCB

back-up floats

Wetwell:

Elevations

--Top = 82.
--Ground = 81.5

--Inlet = 63.0
--Alarm = 62.3

--Lag Pump On = 61.75
--Lead Pump On = 59.28

--Pump Off = 56.50

--Intake =
--Floor =

WETWELL

A. TOTAL VOLUME:

$26 \times 4.5^2 \times \pi \times 7.48 \approx 7500$

B. OPERATING VOLUME:

800

C. ABOVE ALARM VOLUME:

$7500 \cdot \frac{19}{26} \approx 5500$

CYCLE TIME

1. PUMP TIME = $\frac{\text{OPERATING VOLUME}}{\text{PUMP RATE - MIN. INFLOW}}$ $\frac{800}{250 - 50} = 4$

2. FILL TIME = $\frac{\text{OPERATING VOLUME}}{\text{MINIMUM INFLOW}}$ $\frac{800}{50} = 16$

3. CYCLE TIME = 20

4. OVERFLOW TIME = $\frac{\text{ABOVE ALARM VOLUME}}{\text{PEAK FLOW IN}}$ $\frac{5500}{250} = 22$ min

NET POSITITVE SUCTION HEAD:

Atmospheric Head	(+)	33.9
Vapor Head	(-)	-1.0
Friction Head	(-)	
Suction or Head (+) Lift (-)		
NPSH Available		
NPSH Required		

($NPSH_A$ must be > $NPSH_R$)

SUBMERGENCE:

BALZER AND ASSOCIATES, INC.
REFLECTING TOMORROW

LETTER OF TRANSMITTAL

RECEIVED
MAR 29 2006
PRO

3-28-06

DATE ~~2-23-06~~	JOB NO. H0200184
ATTENTION Reed Barrows	
RE McCauley Park Pump Station	

VIA
- ☒ U.S. Mail
- ☐ U.P.S.
- ☐ Airborne Express
- ☐ Fed. Express
- ☐ Hand Delivered
- ☐ Picked Up
- ☐ Other Courier

TO ~~State Health Department~~ Dept of Env. Quality
~~1500 E. Main St.~~ 4949 A Cox Rd.
~~Richmond, VA 23219~~ Glen Allen, VA 23060

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ CD

COPIES	DATE	NO.	DESCRIPTION
2			Revised Plan
1			Revised Specifications

THESE ARE TRANSMITTED as checked below:

☒ For approval ☐ Approved as submitted ☐ Resubmit ____ copies for approval
☐ For your use ☐ Approved as noted ☐ Submit ____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return ____ corrected prints
☐ For review and comment ☐ _____

REMARKS

COPY TO _____ SIGNED: Brandon Sorick

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501 Branchway Road • Richmond, Virginia 23236 • Phone (804) 794-0571 • Fax (804) 794-2635
880 Technology Park Drive • Suite 200 • Glen Allen, Virginia 23059 • Phone (804) 553-0132 • Fax (804) 553-0133
102 Hubbard Street • Blacksburg, Virginia 24060 • Phone (540) 961-0961 • Fax (540) 961-0962

BALZER AND ASSOCIATES INC
REFLECTING TOMORROW

RECEIVED
APR 20 2006
PRO

LETTER OF TRANSMITTAL

DATE	4-19-06	JOB NO.	h0200184
ATTENTION	Reed Barrows		
RE	McCauley Park Pump Sta		

VIA
- ☐ U.S. Mail
- ☐ U.P.S.
- ☐ Airborne Express
- ☐ Fed. Express
- ☒ Hand Delivered
- ☐ Picked Up
- ☐ Other ____

TO VA DEQ
Office of Wastewater Engineering
4949-A Cox Road
Glen Allen, VA 23060

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following items:

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☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
2			Revised Plan
1			Additional Generator and Transfer switch Specs

THESE ARE TRANSMITTED as checked below:

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REMARKS

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